| GUIDELINE | PERFORMANCE | EXCEPTIONS & DEVIATIONS |
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| 1. Status Reports<br>• Notify Supervisor of changes in facility status, and all abnormalities and unexpected situations. | 1. Status Reports<br>• Operators and supervisors follow OPM 10.1, "Procedure for Reporting an Emergency, Unusual or Off Normal Occurrence." Events that do not meet the criteria of OPM 10.1 are reported under the CAD Trouble Report System, see OPM 2.9. The Operator's Log documents day-to-day changes in facility status and is reviewed each day by CAD management. Abnormalities and unexpected situations at TVDG are reported according to the notification list in TVDG OPM 10003, Emergency Notification List, and at CAD in OPM 10.1.a, Occurrence Notification Call List. | 1. Status Reports<br>• None. |
| 2. Safety Practices<br>• Adhere to BNL safety program, including the use of protective equipment. | 2. Safety Practices<br>• OPM 2.2 requires operations crews to adhere to procedures and to sound operating practices. All operators are trained in appropriate safety courses such as electrical safety, radiation safety, and hazardous materials handling. Areas and/or equipment are posted with requirements for protective equipment such as safety glasses, hearing protection, and hard hats. | 2. Safety Practices<br>• None. |
| 3. Inspection Tours<br>• Perform inspection tours to ensure the status of equipment is known.<br>• Use tours to become familiar with the facility condition.<br>• Tour activities should include:<br>• Reviewing equipment status<br>• Looking for unexpected conditions | 3. Inspection Tours<br>• The on-duty Operations Coordinator visits, each shift, experimenters and the experimental areas.<br>• Tour activities are covered in OPM 2.2 "Operating Practices." Shift personnel perform a tour of the accelerators and experimental areas and perform surveillance activities according to their procedures. TVDG OPM 10027, "Facility Startup Inspection" describes facility tours at TVDG.<br>• Tour activities include:<br>• Reviewing equipment status including recording radiation levels, particle fluence rates, system pressures and temperatures. Tours or sweeps are also used to ensure personnel are out of primary and secondary areas before beam is enabled.<br>• Operators are trained to look for unexpected conditions such as water | 3. Inspection Tours<br>• None. |

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|---|---|---|
| • Checking panel & annunciator operation<br><br>• Notation of any deficiencies found | leaks, to check local panels and to check local alarm operation when on tour. The operators are also trained to inspect for area-specific abnormal conditions; for example, see OPM 4.7, "Secondary Beam Line Sweep, Access and Clearance Procedures."<br><br>• Local annunciators alert the person on tour to abnormal conditions. For inaccessible areas, panel annunciators are used to alert the operator in the Main Control Room (MCR). Primary areas are inaccessible during operations periods. Inaccessible areas use various sensors for smoke, water, pressure, ground faults and radiation which annunciate in the Main Control Room and/or at the Target Desk when appropriate.<br><br>• Deficiencies are noted in Trouble Reports or the logs of the various touring groups or, if necessary, reported back up the supervisory chain for immediate action. | |
| 4. Round Tours<br><br>• Use approved Round Tour Inspection Sheets<br><br>• Record key parameters to analyze performance of systems and equipment and to facilitate shift turnover.<br><br>• Round sheets should have the maximum and minimum values and operational safety limits highlighted to facilitate comparison with noted values.<br><br>• Review recorded values for trends. | 4. Round Tours<br><br>• The RCTs, Cryogenic Watch, Experiment Shift Leaders (ESLs) and Collider Accelerator Support (CAS) perform tours and record their findings. Approved inspection sheets are used; for example, area-specific sweep checklists, RCT survey forms, and Hazardous Gas CheckLists.<br><br>• Key parameters for equipment and systems are monitored and recorded in the Main Control Room and at remote locations. Set points are monitored in the Main Control Room every 24 hours. Shift records are maintained and reviewed during an overlap period in the shift change.<br><br>• The maximum and minimum values are in the controls database for parameters monitored from the Main Control Room. Operational safety limits are listed in procedures. Maximum radiation levels are denoted by standard radiological area classifications. Cryogenic and hydrogen target systems have parameter ranges written on their checklists.<br><br>• Radiation surveys and area monitoring data are routinely reviewed to estimate potential future exposure of workers and experimenters. Equipment operations are continually monitored from the Main Control Room and undesirable trends are determined in advance of equipment failures. For example, the radiation monitoring system detects beam losses well before serious radiation events occur. Operators respond to | 4. Round Tours<br><br>• None. |

| GUIDELINE | PERFORMANCE | EXCEPTIONS & DEVIATIONS |
|---|---|---|
| | this alert by returning power supplies back to service or by realigning the beam through magnet current settings. Radiation alarms are automatically recorded. Radiation data is summarized in hourly averages along with beam-intensity data and these values are reviewed periodically by supervisors and management, and daily by the Health Physics staff. The Radiation Safety Committee and the ALARA Committee review the long-term trend of radiation levels. In the event of machine interruption, summaries of operator actions are recorded in the Operations Journal, and the Journal is reviewed each day. Various categories of machine downtime are recorded and long-term trends are examined. The Head of the Cryogenics Group periodically reviews the cryogenic system performance and hydrogen target checklists for trends in pressure or temperature. | |
| 5. Personnel Protection<br>• Conform to DOE Order 5480.11 (ALARA).<br>• Assure proper use of Work Permits.<br>• Supervisors should review exposure trends of workers. | 5. Personnel Protection<br>• Operators are trained in ALARA practices during: a) Rad Worker I training, b) Ring and Cave Access which is the CAD site-specific High Radiation Area training, and c) Contamination Worker training.<br>• Work Permits (OPM 1.11 and OPM 2.28) or Radiation Work Permits (OPM 9.5.4) are required for specific jobs at CAD. Proper use of these permits is reviewed via CAD self-assessments or via quality assurance audits.<br>• Supervisors review exposure trends weekly by reviewing dosimeter data, and monthly by reviewing TLD results. Managers, ALARA Committee members, and supervisors review quarterly dose records via the CAD Performance Indicator program. From time-to-time, special ad hoc committees made up of supervisors and managers are set up to review overall exposure trends at CAD. | 5. Personnel Protection<br>• None. |
| 6. Response to Indications<br>• Identify and correct faulty instruments. | 6. Response to Indications<br>• Prompt action is taken to investigate abnormal or unexpected indication, see, for example, OPM 6.1.2, "Responding to Interlocking Chipmunk Alarms," or OPM 6.1.3, "Responding to Chipmunk Alarms". TVDG OPM 10026, Operations Reporting and LogBooks, describes their Problem Report Log and other logs used to track problems with TVDG equipment or machinery. | 6. Response to Indications<br>• None. |

| GUIDELINE | PERFORMANCE | EXCEPTIONS & DEVIATIONS |
|---|---|---|
| • Believe instrument readings unless proven unreliable. | • Operators are instructed to believe instrument readings and treat them as accurate unless proven otherwise, see OPM 2.2, "Operating Practices," section 2.8. In order to instill trustworthiness, the area-radiation system is calibrated annually according to ANSI standards (see OPM 8.15.1 and 8.15.2), and the function of the Access Control System is tested every six months. See OPM Chapter 4. | |
| 7. Resetting Protective Devices<br>• Understand current conditions prior to resetting protective devices. | 7. Resetting Protective Devices<br>• When a protective device trips the accelerator down to a safe state, such as would happen if unexpected radiation was seen by an area-radiation monitor, an undertaking is made by Operators to understand the trip before the device is reset. The formality of this undertaking is written into procedures. See for example OPM 6.1.2 and OPM 6.1.3. TVDG OPM's include response procedures for alarms of protective devices; for example, OPM 10017, Oxygen Alarm Response, OPM 10021, Broken Zone Response, and OPM 10022, Perimeter Violation Response. | 7. Resetting Protective Devices<br>• None. |
| 8. Load Changes<br>• Supervisor must approve any changes. | 8. Load Changes<br>• The Operations Coordinator approves all power or process rate changes. See OPM 2.2, "Operating Practices," section 2.10. | 8. Load Changes<br>• None. |
| 9. Authority to Operate<br>• Operators should understand their authority to operate and that of the Supervisor. | 9. Authority to Operate<br>• Trained and qualified personnel operate CAD equipment. A computer database and a hard-copy listing in the MCR indicate all authorized operators (see computer-based Permits A, B, C, D, E and G). Responsibilities for all operation personnel (e.g., MCR Operators, Operations Coordinators, Power Room Operators, CAS, Cryogenic Target Watch, RCTs and TVDG operators) are given in OPM 2.1. | 9. Authority to Operate<br>• None. |
| 10. Shift Operating Bases<br>• Establish places for administration, communications, and shift turnover. | 10. Shift Operating Bases<br>• The CAD Main Control Room serves as the operating base. It is equipped with office equipment needed to conduct duties, including communications equipment. It has a separate conference room and other | 10. Shift Operating Bases<br>• None. |

| GUIDELINE | PERFORMANCE | EXCEPTIONS & DEVIATIONS |
|---|---|---|
| | areas for conducting shift changeover activities. Other operating bases include the RCT Trailer, the g-2 Cryogenic Control Room, the RHIC Cryo Control Room, the CAS Target Desk and the TVDG Control Room. These areas are also equipped with communications. | |
| 11. Potentially Distractive Material<br>• Should be prohibited or controlled. | 11. Potentially Distractive Material<br>• Written material not pertinent to operations and entertainment devices are generally prohibited from use by on-duty personnel unless specifically approved by the Head of Operations (see OPM 2.3). | 11. Potentially Distractive Material<br>• None. |